

ROLLER SHADE CUTTING MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a window roller shade cutting machine, and more particularly to a latch-type cutting machine that can be used to cut both blinds and slats of window roller shades.

2. Description of Related Art

A window roller shade often needs to be trimmed to fit a window of a particular size. Generally, a window roller shade purchaser may measure the width of the window and takes the measurements to a store that sells the roller shades. The salesperson takes a roller shade and cuts the roller shade based on the provided measurements. A roller shade typically comprises a roller with a rolled blind and a wooden slat that are respectively made of different materials. Therefore, to cut the blinds and the slats needs different types of cutter.

A latch-type cutting machine may be found in a window roller shade store. However, the conventional cutting machine for a roller shade can be used to cut the blinds only. To cut the wooden slats requires the other machines or cutters. Therefore, it is inconvenient for the salesperson who needs to cut the roller shade because the salesperson must operate two kinds of cutting machines that may be located in different places.

Further, to operate such a latch-type cutting machine for the blinds needs an experienced person because the blinds of the roller shades must be precisely trimmed based on the provided measurements. If the roller shade is cut too short, the roller shade may be completely unacceptable to the purchaser. On the other

1 hand, an insufficient cut of the roller shade will cause the roller shade to be too
2 wide to fit the width of the window. In such a situation, the purchaser must go to
3 the store again and ask the salesperson to cut the roller shade again after the
4 purchaser initially returned home. This will waste time and money for the
5 purchaser, as well as causing a lack of faith in the salesperson's skill.

6 Therefore, a cutting machine that can perform a task of cutting
7 accurately and have a combined function of cutting both the rolled blinds and the
8 slats is beneficial for not only the salesperson but also the purchaser. The present
9 invention provides a cutting machine that can cut precisely the roller shade and
10 has a combined function of cutting both the blinds and the slats to mitigate or
11 obviate the aforementioned problems.

12 SUMMARY OF THE INVENTION

13 The main objective of the invention is to provide a cutting machine to
14 cut a roller shade and the machine has a combined function of cutting both the
15 rolled blinds and the slats such that the machine is convenient for a person who
16 needs to cut the roller shade.

17 Another objective of the present invention is to provide a cutting
18 machine to precisely cut a roller shade.

19 Other objectives, advantages and novel features of the invention will
20 become more apparent from the following detailed description when taken in
21 conjunction with the accompanying drawings.

22 BRIEF DESCRIPTION OF THE DRAWINGS

23 Fig. 1 is an enlarged exploded perspective view of a roller shade;

24 Fig. 2 is a side plan view of a cutting machine in accordance with the

1 present invention;

2 Fig. 3a is an operational front plan view of a slat cutting device of the
3 cutting machine in Fig. 2 after a slat has been prepared for cutting;

4 Fig. 3b is an operational front plan view of the slat cutting device in Fig.
5 3a after the slat has been cut;

6 Fig. 4 is an enlarged side plan view of a shade holder, a shade cutting
7 device and a power assembly of the cutting machine in Fig. 2 and the slat cutting
8 device in Fig. 3a;

9 Fig. 5 is an enlarged top plan view of the shade holder of the cutting
10 machine in Fig. 2;

11 Fig. 6 is an enlarged operational top plan view of the shade holder in Fig.
12 5 when the shade holder firmly clamps a roller of the roller shade in Fig. 1;

13 Fig. 7 is an enlarged operational top plan view of the shade cutting
14 device when a cutting blade is cutting the roller in Fig. 6; and

15 Fig. 8 is an enlarged front plan view of an indicating device of the
16 cutting machine in Fig. 2.

17 **DETAILED DESCRIPTION OF PREFERRED EMBODIMENT**

18 With reference to Figs. 1 and 2, a cutting machine (10) in accordance
19 with the present invention is used to cut and trim a window roller shade (60) to a
20 proper size so that the roller shade (60) can fit a window (not shown) of a
21 particular size. Generally, the roller shade (60) comprises a roller (61), a slat (62),
22 a flat pin end cap (63) and a demountable round pin end cap (64). The roller (61)
23 has a proximal end (not numbered) and a distal end (not numbered) and
24 comprises a core (611) and a rolled blind (612). The blind (612) is wrapped

1 around the core (611) and has a bottom edge (not numbered) and a hem (613).
2 The hem (613) is formed at the bottom edge of the blind (612) to hold the slat
3 (62). The flat pin end cap (63) is fastened at the distal end. The round pin end cap
4 (64) is detachably mounted at the proximal end. If a person needs to trim the
5 roller shade (60), the person must firstly remove the slat (62) from the hem (613)
6 and the round pin end cap (64) from the proximal end of the roller (61).

7 With reference to Figs. 2 and 8, the roller cutting machine (10) in
8 accordance with the present invention comprises a base (11), a track assembly
9 (12), a slat cutting device (13), a shade holder (14), a shade cutting device (15)
10 and a power assembly (16). The base (11) has a top (not numbered) and a bottom
11 (not numbered) and comprises multiple cart wheels (111) and feet (112) that can
12 be selectively used to stand the whole machine on the ground. The track
13 assembly (12) is mounted on the top of the base (11) and comprises a stationary
14 track (121), an adjustable track (122), an indicating device (123) and a balancing
15 pulley assembly (not numbered). The stationary track (121) is mounted
16 vertically on the top of the base (11) and has a top end (not numbered), a bottom
17 end (not numbered) and an inner space (not numbered). The bottom end is
18 fastened on the top of the base (11).

19 The adjustable track (122) is slidably mounted on the stationary track
20 (121) and comprises an adjustable bar (124), a top shade holder (125) and a ruler
21 (126). The adjustable bar (124) is slidably mounted on the stationary track (121)
22 and has a top end (not numbered), a bottom end (not numbered) and a front (not
23 numbered). The top shade holder (125) is attached at the top end of the
24 adjustable bar (124) and comprises a top bracket (1251), a rolling holder (1252)

1 and a bearing (1253). The top bracket (1251) is attached at the top end of the
2 adjustable bar (124) and has an outside end (not numbered). The rolling holder
3 (1252) is rotatably mounted on the top bracket (1251) at the outside end by
4 means of the bearing (1253) and has a bottom recess (not numbered) to hold the
5 flat pin end cap (63) in the roller (61). The rotatable rolling holder (1252) that
6 firmly holds the flat pin end cap (63) of the roller (61) permits the roller (61) to
7 be smoothly rotated as the roller (61) is being cut so that the roller (61) to be cut
8 precisely. The use of the bearing (1253) helps to reduce the friction between the
9 rolling holder (1252) that firmly holds the flat pin end cap (63) and the top
10 bracket (1251) of the top shade holder (125). The reduction of friction ensures a
11 firm and stable grip on the roller (61), which produces consistently precise cut.
12 The ruler (126) is attached to the front of the adjustable bar (124) and is used to
13 measure the required length of the roller (61). Therefore, it is convenient to use
14 the cutting machine (10) to cut the roller shade (60) to acquire a proper length.

15 The indicating device (123) is fastened on the stationary track (121) and
16 comprises an indicator (1231) and a locking knob (1232). The indicator (1231)
17 comprises a stationary segment (not numbered) and an indicating segment (not
18 numbered). The stationary segment is fastened on the stationary track (121). The
19 indicating segment perpendicularly protrudes from the stationary segment and is
20 mounted in front of the ruler (126) to indicate a scale of the ruler (126). The
21 locking knob (1232) is rotatably mounted on the stationary segment at a position
22 corresponding to the adjustable bar (124). The locking knob (1232) can be
23 rotated extending into the stationary segment to interlock the adjustable bar (124)
24 with the stationary track (121) in position.

1 The balancing pulley assembly is mounted in the stationary track (121)
2 and comprises a cord (127), a pulley (128) and a balancing weight (129). The
3 pulley (128) is mounted at the top end of the stationary track (121). The cord
4 (127) partially rolls on the pulley (128) and has an inside end (not numbered) and
5 an outside end (not numbered). The outside end connects to the bottom end of
6 the adjustable bar (124). The inside end extends into the inner space of the
7 stationary track (121) and connects to the balancing weight (129). The balancing
8 weight (129) is movably mounted in the inner space of the stationary track (121)
9 to provide a balanced state of the adjustable bar (124). The use of the balancing
10 weight (129) is used to offset the heavy weight of the adjustable bar (124) in
11 which a little force is required to raise or lower the adjustable bar (124) relative
12 to the stationary track (121) for adjusting the height of the adjustable bar (124)
13 for cutting. Therefore, the adjustable bar (124) will not fall when the locking
14 knob (1232) has not yet interlocked with the adjustable bar (124). In addition,
15 since the adjustable bar (124) moves along the stationary track (124) in vertical
16 path, there is no deviation or unevenness when adjusting the adjustable bar (124)
17 upward or downward, which produces a straight and precise cut. The adjustable
18 bar (124) is convenient to adjust.

19 With reference to Figs. 2, 3a and 3b, the slat cutting device (13) is
20 mounted on the stationary track (121) and comprises a mounting bracket (131), a
21 slat guiding block (132), a rolling cutter (133), a handle (134) and a transparent
22 cover (135). The mounting bracket (131) is fastened on the stationary track (121)
23 and has two parallel wings (136) each of which has a distal end (not numbered)
24 and is protruded toward the front of the adjustable bar (124). The slat guiding

1 block (132) is mounted on the mounting bracket (131) and between the wings
2 (136), and has a longitudinal through hole (137) and a curved bottom (not
3 numbered). The rolling cutter (133) is rotatably mounted between the wings (136)
4 and has a cutting recess (1331) and an exterior periphery (not numbered). The
5 cutting recess (1331) is defined in the exterior periphery and is aligned with the
6 longitudinal through hole (137). The exterior periphery is partially flush with the
7 curved bottom of the slat guiding block (132). The handle (134) connects to the
8 rolling cutter (133) outside one of the wings (126) to rotate the rolling cutter (133)
9 to change an angular position of the cutting recess (1331). The cover (135) is
10 attached to the distal ends of the wings (136) and has two parallel basis lines
11 (1351) respectively formed above and below the curved bottom of the slat
12 guiding block (132).

13 To operate the slat cutting device (13) to cut the slat (62), the person
14 must measure and mark a line (not shown) across the slat (62) at a place where it
15 needs to be cut. The handle (134) is lifted to about 90 degrees relative to the
16 vertical direction in order to align the cutting recess (1331) in the rolling cutter
17 (133) with the longitudinal through hole (137) in the slat guiding block (132).
18 The slat (62) is inserted into the longitudinal through hole (137) by centering the
19 marking line on the slat (62) between the basis lines (1351). The handle (134) is
20 then swiftly turned downwards by a user for a precise cut of the slat (134) to
21 complete the cutting operation for the slat (62).

22 With reference to Figs. 4, 5 and 6, the shade holder (14) is mounted on
23 the stationary track (121) and comprises a stationary base (141) and a rotatable
24 chuck (142). The stationary base (141) is fastened on the stationary track (121)

1 and has a longitudinal through hole (1411). The chuck (142) is rotatably
2 mounted in the through hole (1411) and comprises a turning table (143), a
3 clamping device (144) and a driven pulley wheel (145). The turning table (143)
4 is rotatably mounted in the through hole (1411) of the stationary base (141) and
5 has a top (not numbered), a bottom (not numbered), a central through hole (1431)
6 and an outside knob holder (1432). The central through hole (1431) is defined
7 through the top, is aligned with the rolling holder (1252) and has a center (not
8 numbered). The driven pulley wheel (145) is mounted on the bottom of the
9 turning table (143). The outside knob holder (1432) is formed on the top of the
10 turning table (143).

11 The clamping device (144) is mounted on the top of the turning table
12 (143) and comprises a movable base (1441), an adjusting device (not numbered),
13 a first jaw (1442) and a second jaw (1443). The movable base (1441) is slidably
14 mounted on the top of the turning table (143) and has a top (not numbered), a slot
15 (1444) and an inside knob holder (1445). The slot (1444) is defined through the
16 top and corresponds to the central through hole (1431) of the turning table (143).
17 The inside knob holder (1445) is mounted on the top of the movable base (1441)
18 across the slot (1444), is parallel to the outside knob holder (1432) and has a
19 transverse threaded hole (1446).

20 The adjusting device is rotatably mounted on the outside knob holder
21 (1432) and comprises a clamping knob (146), a threaded external shank (147)
22 and a threaded internal shank (148). The threaded external shank (147) screws
23 into the transverse threaded hole (1446) of the inside knob holder (1445) and has
24 an exterior thread (not numbered), an inside end (not shown), an outside end (not

1 numbered) and a longitudinal threaded hole (1471). The inside end connects to
2 the clamping knob (146) and is rotatably held in the outside knob holder (1432).
3 The outside end screws into the transverse threaded hole (1446) of the inside
4 knob holder (1445). The longitudinal threaded hole (1471) has an interior thread
5 (not numbered). The threaded internal shank (148) has an exterior thread (not
6 numbered) and an outside end (not numbered). The exterior thread of the
7 threaded internal shank (148) is counter to the exterior thread on the threaded
8 external shank (147) and screws with the interior thread on the longitudinal
9 threaded hole (1471). For example, if the exterior thread on the threaded external
10 shank (147) is a right-hand thread, the exterior thread of the threaded internal
11 shank (148) is a left-hand thread. The outside end of the threaded interior shank
12 (148) connects to the first jaw (1442).

13 The first jaw (1442) is slidably received in the slot (1444) of the movable
14 base (1441) and is selectively pulled and pushed by the outside end of the
15 threaded interior shank (148). The second jaw (1443) is fastened on the movable
16 base (1441) and is parallel to the first jaw (1442). The first and the second jaws
17 (1442, 1443) are diametrically mounted outside the central through hole (1431)
18 of the turning table (143). Therefore, the first and the second jaws (1442, 1443)
19 are moved to approach the center of the central through hole (1431) to complete
20 a self-centering movement as turning the clamping knob (146) rotates the
21 external and the internal threaded shanks (147, 148) in different directions.

22 When the threaded external shank (147) is rotated, the revolutions of the
23 threaded external shank (147) will pull the movable base (1441) towards the
24 outside knob holder (1432), which will simultaneously move the second jaw

1 (1443) towards the center of the central through hole (1431). Meanwhile, the
2 outside end of the threaded internal shank (148) extends out of the longitudinal
3 threaded hole (1471) of the threaded external shank (147) and pushes the first
4 jaw (1442) toward the center of the central through hole (1431). Therefore, the
5 roller (61) can be concentrically clamped by the two jaws (1442, 1443).

6 With reference to Figs. 4 and 7, the shade cutting device (15) is mounted
7 on the stationary track (121) below the stationary base (141) of the shade holder
8 (14) and comprises a cutter mounting frame (151), a side cover (152), a cutter
9 stationary block (153), a cutter sliding block (154), a cutting blade (155), a
10 cutting handle (156) and a cutter feeding disk (157). The cutter mounting frame
11 (151) is fastened on the stationary track (121) and has a top (not numbered) and a
12 side (not numbered). The side cover (152) is attached to the side of the cutter
13 mounting frame (151) and has a handle slot (1521). The cutter stationary block
14 (153) is mounted on the top of the cutter mounting frame (151) and has a top (not
15 numbered). The cutter sliding block (154) is slidably mounted on the top of the
16 cutter stationary block (153) and has a top (not numbered), a bottom (not
17 numbered) and a rectangular recess (1541). The recess (1541) is defined in the
18 bottom and has four edges (not numbered). The cutting blade (155) is
19 demountably mounted on the top of the cutter sliding block (154) at a position as
20 a datum for the ruler (126), which means the position of the cutting blade (155) is
21 the zero degree of the ruler (126). The feeding disk (157) is rotatably mounted in
22 the recess (1541) in the cutter sliding block (154) and has an eccentric portion
23 (not numbered). The eccentric portion abuts three of the edges of the recess
24 (1541). The cutting handle (156) connects to the feeding disk (157) to rotate the

1 eccentric portion and comprises a connecting bar (1561) and a safety handle
2 sleeve (1562). The connecting bar (1561) has an inside end (not numbered) and
3 an outside end (not numbered). The inside end is eccentrically connected to the
4 feeding disk (157) to form the eccentric portion. The outside end extends
5 through the handle slot (1521). The handle sleeve (1562) is retractably mounted
6 on the outside end of the connecting bar (1561) and engages the handle slot
7 (1521) to hold the cutting handle (156) in position. In such a state, the cutting
8 handle (156) cannot be rotated to feed the cutting blade (155) to prevent the
9 cutting blade (155) from being unintentionally cut.

10 With reference to Fig. 4, the power assembly (16) is mounted on the
11 stationary track (121) and comprises a control box (161), an actuator (162), a
12 drive pulley wheel (163) and a pulley belt (164). The control box (161) is
13 mounted on the stationary track (121) and electrically connects to the actuator
14 (162). The actuator (162), such as a motor with a shaft is mounted on the
15 stationary track (121). The drive pulley wheel (163) is mounted on the motor
16 shaft and is rotated by the motor shaft. The pulley belt (164) connects the drive
17 pulley wheel (163) to the driven pulley wheel (145) to transmit power to spin the
18 rotatable chuck (142) as the actuator (162) is powered on. With reference to Figs.
19 2 to 7, when cutting machine (10) is used to cut the roller (61), the first step is to
20 loosen the locking knob (1232) of the indication device (123) to adjust the
21 adjustable bar (124) to obtain the same length as the desired length of the roller
22 (61). For example, if the roller (61) is to be 72 inches long, then the adjustable
23 bar (124) is adjusted to make sure the bar measurement points at the 72 inch
24 mark on the ruler (126) by the indicator (1231). The next step is to loosen the

1 clamping knob (146) of the clamp device (144) to permit the proximal end of the
2 roller (61) to extend into the opening between the first and the second jaws (1442,
3 1443), and eventually extend out of the central through hole (1431) of the turning
4 table (143). The third step is to insert the distal end of the roller (61) with the flat
5 pin end cap (63) into the bottom recess of the rolling holder (1252) and firmly
6 push the roller (61) up against rolling holder (1252) after the round pin end cap
7 (64) has been removed. Now, the clamping knob (146) is turned to tighten to first
8 and the second jaws (1442, 1443) to firmly clamp around the roller (61). The
9 next step is to power on the actuator (162) by means of the control box (161). As
10 the actuator (162) spins the roller (61), the handle sleeve (1562) is pulled
11 outward to disengage the handle slot (1521), which allows the cutting handle
12 (156) to be turned. Then, the cutting handle (156) is pulled firmly to rotate the
13 eccentric portion of the feeding disk (157) against the edges of the rectangular
14 recess (1541) of the cutter sliding block (154) to move the cutting blade (155)
15 toward the spinning roller (61), whereby the spinning roller (61) is cut. After the
16 cutting operation is completed, it is necessary to stop the actuator (162) and
17 remove the roller (61) from the shade holder (14). The final step is to return the
18 cutting handle (156) to its original position.

19 After the cutting operations for the roller (61) and the slat (62) have been
20 finished, the round pin end cap (64) and the slat (62) are reinserted into the roller
21 (611) and the hem (613) to achieve a correctly sized window roller shade. Since
22 the roller (61) and the slat (62) can be cut in the same machine, it is convenient
23 for the salesperson to trim the roller shade. Furthermore, the adjustable bar (124)
24 contains the ruler (126) that is an aid for the measurements of the roller (61) and

1 a precise cut for the roller (61). Consequently, the cutting machine (10) in
2 accordance with the present invention is not only convenient but also helpful for
3 cutting and trimming the roller shade to a particular size.

4 Even though numerous characteristics and advantages of the present
5 invention have been set forth in the foregoing description, together with details
6 of the structure and function of the invention, the disclosure is illustrative only,
7 and changes may be made in detail, especially in matters of shape, size, and
8 arrangement of parts within the scope of the appended claims.